

Rebuilding a Cessna 150/152 Nose Strut

By: Charles Hanna

How about a short step by step...

Glossary of terms:

Piston	That shiny chrome thing with the fork and nosewheel attached to it. Also known as the inner cylinder
Outer cylinder	The part bolted and pinned into the engine mount. Also known as the strut housing or cylinder.
Orifice tube	Inside the outer cylinder, retained by the roll pin thru the engine mount and is the part the Schrader/Dill valve is screwed into.
Metering pin	Inside the shiny chrome thing. Retained by a nearly hidden nut.
Lower plug	plugs the bottom of the piston and is the part the metering pin is mounted in.
Lower bearing	Also known as the seal carrier. It is a bronze piece with an o-ring on the outside (the static seal) and an o-ring on the inside (the dynamic seal) both of which have backup rings installed with them.
Upper bearing	Found on the top of the strut piston, bronze and slides up and down inside the cylinder. Retained by a wire-type snap-ring
Fork	Installed between the shiny chrome thing and the wheel.

- 1) Weigh the tail down with a couple of sandbags strategically placed on the horizontal stab, as far inboard as possible and centered on the spar. Do this carefully, using towels, etc to protect your paint and so as to not dent the skin, and slowly follow the tail to the ground, so as to not slam it. If you are in a hangar or tight spot, make sure its clear behind the rudder. If you don't like getting the tail down my way, do it your way, just be safe and secure about it.
- 2) Remove the valve cap from the Schrader and depress the core to bleed off the pressure. If you want, remove the core with a valve core tool (sometimes found made into the cap of some auto/truck valve stem caps)
- 3) Remove the nose wheel and fairing (if installed). Removing the fairing involves removing the bolt where the tow pin passes thru the inner cylinder (or piston). Leave this bolt out for now.

Note: On early 150's the nose wheel is retained thru the bearings and fork by a 5/16 bolt subject to lots of wear from shear loads, examine it closely and replace it if its the least bit suspect. It's an AN5-74 if you don't have wheel fairings. Later 150's have 3/8 bolts and don't have as serious a problem with the bolts breaking, loss of nosewheel, etc.

- 4) Look around the base of the cylinder on the outside, you will find a small hole that you can put a small punch in to dislodge the snap ring inside, and while holding it dislodged, use another small screwdriver to catch and remove the ring. Allow it to fall down the piston.

- 5) Disconnect the torque links, I prefer to do it at the center joint as you are not going to lose any shimming found on the upper and lower connections this way.
- 6) Put a large catch pan under the fork and pull down on the fork. The piston, with the snap ring, flat ring above it, scraper above that and the lower bearing/seal carrier will all come out together.
- 7) After cleaning up the mess, turn the piston's open top down into the pan to drain the remaining fluid if it didn't spill out when you got ticked off at the mess and laid the piston down on the floor.
- 8) Disassemble the piston as follows.
 - a) Remove the snap ring on top
 - b) Pull off the upper bearing under the piston
 - c) Slide off the lower bearing/seal carrier
 - d) Slide off the scraper, retainer washer, and snap ring.
- 9) If you are intent on replacing the metering pin o-ring and the lowerplug o-ring, hold the piston inverted and look inside the hole in the middle top of the fork. You will see the bottom of the plug and the nut retaining the metering pin. Using devices of your own choosing (and I recommend a long brass or aluminum drift), carefully drive the plug away from the fork, thru the piston and out the top.
- 10) After getting the metering pin and plug out, you can remove the nut on the bottom and separate the pin from the plug. You cannot get the lower plug out the fork end of the tube as the fork retaining bolt is in the way. You can remove it and drive the plug out the fork end but you must thoroughly clean all crud, dirt, mud, paint, etc from the inside so it won't destroy the plug. The plug will slide all the way thru the piston fairly easily, once the o-ring is broken loose.
- 11) If you are intent on replacing the o-ring on the orifice tube at the top of the strut, remove the roll pin that passes thru the engine mount and strut cylinder. If you want to remove the entire cylinder you also need to remove the lower clamp bolt from the engine mount, disconnect the steering rods and pull out the cylinder. You can drive the orifice tube out the top of the cylinder (or thru the cylinder and out the bottom if you don't want to remove the cylinder from the mount.)
- 12) The seal under the Schrader/Dill valve body is an aluminum washer and usually doesn't cause any problems, if you have one you can remove the valve body and replace it.
- 13) Remove all o-rings and backup rings and clean everything with mineral sprits, or similar. Install the new o-rings in the appropriate places with backup rings in the proper places. Coat all o-rings with Parker O-lube or Vaseline, before installing.
- 14) Reassemble in reverse, using lots of Parker O-lube or Vaseline on everything. After an hour or so of screwing with the snap ring in the bottom of the strut, take a break, it will go right in when you come back to it.
- 15) When you are all done, leave the valve core out and put a 3-4 ft section of 1/4 inch Tygon tubing on the valve over the threads, good tight force fit.
- 16) Put the other end of tube in a can of Mil-5606 hydraulic oil, this needs to be a gallon at least.
- 17) Push up fully on the wheel/fork/wheel fairing till the strut is fully compressed.

- 18) Pull down slowly till strut is fully extended allowing fluid to flow into the strut.
- 19) Repeat 16 and 17 numerous times till you observe no air bubbles coming out of the Tygon hose when you push the piston up.
- 20) When you have no more air in the strut, push the piston up fully one last time and remove the hose from the valve body, and install the valve core.
- 21) Carefully/slowly inflate the strut with nitrogen to 30-40 psi, the strut will fully extend, and maintain the 30-40 psi.
- 22) Remove the nitrogen hose, remove the sandbags and let the nose onto the floor. Kick the nose tire, pull down on the prop hub (mags off, key out, safety first)
- 23) If the strut is too high, bleed off a slight amount by depressing the valve core for a split second. Repeat the kicking and pulling routine, and the bleeding of excess N₂ till you are satisfied with the height.
- 24) If you let out too much, start over at 20 and do it again.

Notes: High pressure valve cores have an "H" stamped on the head of the "pin" (or a dash mark "-"). You may need a magnifier to see it. The cap should be a hex brass cap with a rubber seal inside. The seal should have a brass ring embedded in it to keep the rubber from depressing the core when it is screwed on, older caps may not have this ring in the seal, and if yours doesn't throw it away and get a new one.

When done and it still leaks, call your A&P, IA, admit defeat and ask for forgiveness. In any case don't perform this work unless you have the blessing of your A&P/IA as you are performing work that a properly rated person must sign off. If you are a mechanical klutz you've got no business doing this anyhow and your IA is going to yell at you, if you are just unlucky, you don't have any business flying airplanes, so go ahead and sell it where it sits and take up a safer hobby.

If you are intent on doing a through job, with the strut cylinder removed, remove the snap ring on the top of the steering collar and remove it and thoroughly wash everything in solvent and regrease the steering collar bearing thoroughly and reinstall, using the shims required underneath it, shimming as called for in the maintenance manual.

If you have gone this far you may want to reshim/rewasher the shimmy dampener attachments, install new bolts bushings etc. You might also want to replace the bolts, bushings, etc. on the torque links. If you've gone this far you might also want to overhaul the shimmy dampener and replace the steering rods too, you know they are worn out too.

Hell, if you've gone this far, go ahead and jerk the motor and over haul it, it probably needs it too. Well hell, overhaul the whole airplane!!!

Well it isn't very short is it? Not really a job for the faint of heart.